The lastpage package

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Abstract

This LaTeX package puts the label `LastPage` at the end of the document into the `.aux` file, allowing the user to refer to the last page of a document. This might be particularly useful in places like headers or footers. –
While this package allows for things like
"Page `\thepage{}` of `\pageref{LastPage}`" to get "Page 7 of 9" or "Page VII of IX", the *number* of pages is nowadays available via `\@abspage@last` from the kernel, but when more than one page numbering scheme is used (for example pages I to X and then 1 to 10, thus number of pages "20", but name of the last page "10"), or when or the fnsymbol page numbering scheme is used, or another package has output after this package, or the page numbers exceed a certain range, there might be problems, which can be solved by using the pageslts package instead.

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Note: At several places in this manual as alternative the pageslts package is "advertised". The current version 2015/12/21 v1.2f of that package has not yet been updated to the new hook mechanism. In special cases (for example `\pagenumbering{fnsymbol}`) the current version of that package combined with a current LaTeX-format fails. Together with about 80 other packages (small to large, public as well as private, some probably obsolete) it is in the update queue.

Contents

1 Introduction

This LaTeX package puts the label `LastPage` (at end of the document) into the `aux` file, allowing the user to refer to the last page of a document via `\pageref{LastPage}`. This might be particularly useful in places like headers or footers.

This package was invented by **Jeffrey P. Goldberg**, and is now maintained by H.-Martin Münch. A big "Thank you!" to Jeffrey P. Goldberg for granting this.

If you are more ambitious in respect to your aims with this package, you might want to have a look at the pageslts package (see section 4: Alternatives).

2 Usage

Just load the package placing

```
\usepackage{lastpage}
```

in the preamble of your source file (or `\input{lastpage.sty}` if `\usepackage` is unknown).

For example for various draft forms it is desirable to have a page reference to the last page, so that e. g. page footers can contain something like "page N of K", where N is the current page and K is the last page. Once the package is loaded, anywhere in the text references can be made to the label `LastPage`. In particular one can use the fancyhdr or nccfancyhdr package, or redefinitions of the page headings and footings to get a reference to the last page.
In your document the code

```
\makeatletter
\renewcommand{\@evenfoot}{%
 \normalsize\slshape DRAFT \today\hfil \upshape %
 page \thepage{} of \pageref{LastPage}}
\renewcommand{\@oddfoot}{\@evenfoot}
\makeatother
```

creates footers like

"*DRAFT April 12, 2023* page 7 of 9"

in the compiled document (cf. the `lastpage-example` file).
If the hyperref package is used, the references are hyperlinked to their aims. If these hyperlinks shall be suppressed, `\pageref*{...}` instead of `\pageref{...}` can be used.

The lastpage package does not provide the words "page" or "of", but e. g. the handout class uses "of" in the definition of the footer. (In the `lastpage-example` also `\@evenfoot` is redefined, but it is not the lastpage *package* redefining this.) If you want to change "page" or "of" (e. g. to another language), you therefore have got to look in the used class/package(s)/preamble instead of in the lastpage package.

If the total *number* of pages of a document is needed, the kernel already gives this by `\makeatletter\@abspage@last\makeatother` (needs at least two compiler runs).

3 Some Warnings

3.1 \AtEndDocument

\AtEndDocument is not used by the lastpagemodern.sty version of the lastpage package, requiring LaTeX-format 2022-11-01 or newer. Instead \AddToHook{enddocument/afterlastpage} is used and the problem does not arise.

lastpageclassic.sty uses \AtEndDocument and lastpage209.sty redefines \enddocument. The last two cases are problematic:
The output of a LaTeX 2_ε run is not independent of the order in which the packages are loaded. It is often the case that the same formats for which one must put tables and figure at the end, are the ones in which endnotes are also required. If one wants to use \AtEndDocument here as well (as done for \pageref{LastPage}), then it is easy to get to three separate uses of \AtEndDocument (assuming one uses this for the endnotes as well). Clearly it is not safe for any package writer or user to assume that no material will follow what they put into \AtEndDocument. Therefore a message, which begins with AED, is included in every usage of \AtEndDocument.
lastpage uses \AtEndDocument{...\clearpage...}, thus
\usepackage{lastpage}...\AtEndDocument{*something*} will place *something* after the \clearpage. To place it earlier, use
\AtEndDocument{*something*}...\usepackage{lastpage}. If the *something* is not known before \usepackage{lastpage}, you can use for example

```
...
\def\beforeLastpageClearpage{\relax}
\AtEndDocument{\beforeLastpageClearpage}
\usepackage{lastpage}
\begin{document}
...
\def\beforeLastpageClearpage{\textit{something}}%
...
\end{document}
```

(might need a protected and/or expanded \def). When \clearpage leads to some output, \clearpage\textit{something} instead of \textit{something} might be wanted.

3.2 Interaction with ancient versions of the endfloat package

\AtEndDocument is not used by the lastpagemodern.sty version of the lastpage package, requiring LaTeX-format 2022-11-01 or newer. Instead \AddToHook{enddocument/afterlastpage} is used and the problem does not arise.

The *ancient* version 2.0 (and earlier; 2.0 from 1992; current version at the time of updating this documentation: 2.7 from 2019) of the endfloat package actually redefined the \enddocument command, and so interfered drastically with the LaTeX 2_ε commands which make use of \AtEndDocument. If you want your LastPage to label the last page of these end floats, you need to load lastpage after loading endfloat (or use VeryLastPage from the pageslts package instead). If, on the other hand, you *want* LastPage to refer to the (not so) last page, exclusive of the floats at the end, then load in the reverse order. Independent from the order of lastpage and endfloat, you will still need a version of endfloat later than 2.0 from 1992.

Other LaTeX2.09 (!) packages also seem to like to redefine \enddocument. In addition to the old endfloat, harvard comes to mind. All of these will need to be modified swiftly.

3.3 Page name instead of page number

When any page numbering scheme other than `arabic` is used at the page, which `\pageref{LastPage}` refers to, the *name* and not the *number* of the page is given. For example, `Alph` page numbering scheme and 10 pages will give `J` instead of 10, `Roman` page numbering scheme and 10 pages will give `X` instead of 10, and so on.

(The pageslts package puts `\lastpageref{LastPages}` (with **s** at the end) at your disposal for remediation.)

3.4 No write access to the aux file

Some packages (e. g. tikz and selectp) sometimes prevent the output to the `aux` file. In that case a warning is issued. This is no problem as long as there is another compilation run where the label to the last page can be placed via the `aux` file.

3.5 Wrong last page number with more than one page numbering scheme

When more than one page numbering scheme is used, `LastPage` does not give the total **number** of pages (even if `arabic` is the page numbering scheme of that page). For example, for a document with VI+36 pages, it gives "36" as reference to the last page. While this is correct, the total number of pages is 42.
If the total *number* of pages of a document is needed, the kernel already gives this by `\makeatletter\@abspage@last\makeatother`. The pageslts package puts `\lastpageref{LastPages}` (with **s** at the end) at your disposal for remediation, giving the number of pages and linking to the last page, if linking is provided for examaple by the hyperref package.

3.6 `\addtocounter{page}{...}` and `\setcounter{page}{...}`

When the page number was manipulated by `\addtocounter{page}{...}` or `\setcounter{page}{...}`, `LastPage` does not give the total **number** of pages (even if `arabic` is the page numbering scheme of that page).
The pageslts package puts `\lastpageref{LastPages}` (with **s** at the end) at your disposal for remediation: `LastPages` ignores page number manipulation. Also `\@abspage@last` from the kernel is not influenced by page number manipulation.

3.7 Page number reset by `\pagenumbering{...}`

At a page numbering change the page number is reset to one. Therefore `LastPage` does not give the total **number** of pages (even if `arabic` is the page numbering scheme of that page). Furthermore, now two pages have the same name.
The pageslts package does not only put `\lastpageref{LastPages}` (with **s** at the end) at your disposal for remediation: `LastPages` also ignores page number manipulation. It furthermore offers the option `pagecontinue` to continue the page numbering, when `\pagenumbering{...}` is used.

3.8 Last pages of different page numbering schemes

`\pageref{LastPage}` refers to the (maybe not so) last page of the last page numbering scheme. References to the respective last page of the other page numbering schemes are not provided.
The pageslts package does this with labels `pagesLTS.<numbering scheme>`, where `<numbering scheme>` is e. g. arabic, roman, Roman, alph, or Alph. For fnsymbol please use `\lastpageref{pagesLTS.fnsymbol}` instead of `\pageref{pagesLTS.fnsymbol}`.

3.9 Current page

The command `\thepage` gives the **name** of the current page in the current page numbering scheme, which is different from the current total/absolute page number e. g. with a second page numbering scheme, `\addtocounter{page}{...}`, or `\setcounter{page}{...}`, and it will not be an arabic number at all, if the current page numbering scheme is not arabic.
The pageslts package provides the command `\theCurrentPage` and for the current number of pages in the current page numbering scheme
`\theCurrentPageLocal`. The kernel already provides the number of pages, which have been shipped out, as `\the\ReadonlyShipoutCounter`. The current page is always `ReadonlyShipoutCounter +1`.

3.10 First page

There is no special label at the first page. (This is the **lastpage** package, after all.)
The pageslts package creates a label `pagesLTS.0` at the first page of the document.

3.11 Using the fnsymbol page numbering scheme

Using the `fnsymbol` page numbering scheme can result in problems!
When the page, where `\pageref{lastpage}` points at, is in `fnsymbol` page numbering scheme, this package might screw up – and quite totally for that, especially when used together with *very old* versions of the hyperref package (e. g. hyperref v6.80x as of 2010/04/17). When testing with version v6.83m as of 2012/11/06 everything seemed to worked fine, but this might not always be the case.
The pageslts package with `\lastpageref{lastpage}` and appropriate package options should cope even with this case.

3.12 Page counter overflow

"The ranges of supported counter values are more or less restricted. Only `\arabic` can be used with any counter value TEX supports.

Presentation command	Supported domain	Ignored values	Error message 'Counter too large'
`\arabic`	`-MAX..MAX`		
`\roman`, `\Roman`	`1..MAX`	`-MAX..0`	
`\alph`, `\Alph`	`1..26`	0	`-MAX..-1, 27..MAX`
`\fnsymbol`	`1..9`	0	`-MAX..-1, 10..MAX`

`MAX` = `2147483647`

" (Heiko Oberdiek: The alphalph package, 2010/04/18, v2.3, first table, p. 2).

When *any* page is out of that range, there will be a counter overflow.
lastpage probably is not the right package to be asked to correct this anyway, but the pageslts package (with appropriate options) can do this.

3.13 Other packages manipulating `\lastpage@putlabel`

The hyperref package redefines the `\lastpage@putlabel` command, and the revtex4 class redefines the `\lastpage@putlabel` command, and the hyperref package redefines the `\lastpage@putlabel` command, if the revtex4 class is used, and the pageslts package "kills" the `\lastpage@putlabel` command, because that package uses more advanced labels.
In my humble opinion it would be preferably if one package (the original one, i. e. lastpage) would do the job right, all others packages would check for the version of that package, and if an old version is found, an error (or at least a warning) message about the use of an outdated package is given, and *then* as "last aid" the

command of the outdated package is redefined.
Therefore here none of the definitions or commands of the other packages is altered, but `\lastpage@putlabel` was replaced by `\lastpage@putl@bel`. Because `\lastpage@putlabel` is no longer called, now there should not be any double definitions of the `lastpage` label.

4 Alternatives

There are similar packages, which do (or do not) similar things (or even more). As I neither know what exactly you want to accomplish when using this package (e. g. page number vs. page name, hyperlinks or not), nor what resources you have (e. g. TEX, LATEX2e, ε-TEX, LATEX-format as recent as 2022-11-01 or newer), here is a list of some possible alternatives:

`pageslts` **- Note: The current version 2015/12/21 v1.2f of the pageslts package has not yet been updated to the new hook mechanism. In special cases (for example `\pagenumbering{fnsymbol}`) the current version of that package combined with a current LATEX-format fails. Together with about 80 other packages (small to large, public as well as private, some probably obsolete) it is in the update queue.**
The pageslts package first started as a revision of this lastpage package, but it became obvious that a replacement was needed to accomplish what the pageslts package does. For backward compatibility, a label named `LastPage` is provided. Thus `\usepackage{lastpage}` can be replaced by
`\usepackage[pagecontinue=false,alphMult=0,AlphMulti=0,`
`fnsymbolmult=false,romanMult=false,RomanMulti=false]{pageslts}`,
if the behaviour of the lastpage package should be simulated. The default options are
`\usepackage[pagecontinue=true,alphMult=ab,AlphMulti=AB,`
`fnsymbolmult=true,romanMult=true,RomanMulti=true]{pageslts}`.
Benefits of pageslts package (with appropriate options) are:

+ Labels `LastPage` (`\AtEndDocument`) and `VeryLastPage` (`\AfterLastShipout`), allowing the user to refer to the (very) last page of a document.
+ For example, when more than one page numbering scheme is used, the label `LastPages` gives the total *number* of pages.
+ At the last page of each page numbering scheme a label `pagesLTS.<numbering scheme>` is placed, where `<numbering scheme>` is e. g. arabic, roman, Roman, alph, or Alph. For fnsymbol please use `\lastpageref{pagesLTS.fnsymbol}` instead of `\pageref{pagesLTS.fnsymbol}`.
+ When the same numbering scheme is used twice, the page numbers are either reset to one or continued automatically, depending on the option given when the package is called.
+ The command `\theCurrentPage` prints the current total/absolute page number – in contrast to `\thepage`, which gives only the page *name* in the current page numbering scheme. `\theCurrentPageLocal` gives the current number of pages in the current page numbering scheme. `\thepage` and `\theCurrentPageLocal` are different e. g. when `\addtocounter{page}{...}` or `\setcounter{page}{...}` were used.
+ At the first page of the document a label `pagesLTS.0` is created.
+ The alphalph package is supported, i. e. page numbers alph or Alph > 26 and fnsymbol > 9 can be used (with according options set). Even zero and negative page numbers can be used with `arabic`, `alph`, `Alph`, `roman`, `Roman`, and `fnsymbol` page numbering (with alphalph package and according options).

+ It is checked whether a (very) old endfloat package is in use. If it is, a warning or even an error message is given, depending on endfloat version.
+ A rerun warning is given, when labels have changed.

Further labels are provided for special cases.

`totpages` - The totpages package provides a `totpages` label similar to `LastPages` `\AtEndDocument` (instead of `\AfterLastShipout`, as done by pageslts). The totpages package additionally computes the number of paper sheets needed to (double) print the document (with one, two, three,... pages on one sheet of paper) (which can be achieved also with the papermas package, an extension of the pageslts package, which further allows to compute the mass of that printed version of the document, useful e. g. when sending it by mail to determine the postage).

`nofm.sty` - "There is a package nofm.sty available, but some versions of it are defective, and most don't work with fancyhdr because they take over the complete page layout."(Piet van Oostrum: Page layout in LaTeX, March 2, 2004, section 16; fancyhdr.pdf)
nofm as of 1991/02/25 (without version number), available at https://mirror.ctan.org/obsolete/macros/latex209/contrib/misc/nofm.sty, does not work with e. g. hyperref, redefines `\enddocument` as well as `\@oddhead`, `\@evenhead`, `\@oddfoot`, and `\@evenfoot`.
If you know the (CTAN) location of a **working** (!) version, please send an e-mail to the lastpage maintainer, thanks!

`count1to` - You may want to have a look at the count1to package.

`totalcount` - The totalcount package provides `\totalpages`. If there are only arabic page numbers consecutively running from 1 to the last page, this works. But for example

```
\documentclass{article}
\usepackage[page]{totalcount}
\pagenumbering{Roman}
\begin{document}
\addtocounter{page}{49}
Page \thepage{} of \totalpages
\end{document}
```

prints "Page L of 50", where the number of pages is one (and no hyperlink is provided to the last page even if hyperref is used).

`zref` - The zref package of Heiko Oberdiek requires ε-TeX. lastpageclassic does not require ε-TeX, but if you already have ε-TeX (and use lastpagemodern), you may also have a look at the extensive zref package, whether it suits your needs better (or additionally or whatsoever).

`memoir` - The memoir *class* provides `\thelastpage` (page number printed on last page) and `\thelastsheet` (number of pages).

`LaTeX-kernel` - The number of pages is nowadays available via `\@abspage@last` from the kernel, but when more than one page numbering scheme is used (for example pages I to X and then 1 to 10, thus number of pages "20", but name of the last page "10"), or when or the fnsymbol page numbering scheme is used, or another package has output after this package, or the page numbers exceed a certain range, there might be problems.

(You programmed or found another alternative, which is available at CTAN.org? OK, send an e-mail to me with the name, location at CTAN.org, and a short notice, and I will probably include it in the list above.)

About how to get those packages, please see subsection 7.1.

5 Example

```
⟨*example⟩
\documentclass[british]{article}[2022/07/02]% v1.4n Standard LaTeX document class
\makeatletter
\@ifl@t@r\fmtversion{2022/11/01}{%
  \AddToHook{enddocument/afterlastpage}[lastpage]{%
          \message{^^JLaTeX Info: Executing hook ‘enddocument/afterlastpage’.}}%
}{\AtEndDocument{\message{^^JLaTeX Info: Executing hook ‘AtEndDocument’.}}%
 }
\makeatother
\usepackage[draft]{showkeys}[2022/04/12]% v3.18 Show cite and label keys (DPC, MH)
%%      Use final instead of draft to hide the keys. %%
\usepackage{hyperref}[2023-02-07]% v7.00v Hypertext links for LaTeX
\hypersetup{extension=pdf,%
 plainpages=false,%
 pdfpagelabels=true,%
 hyperindex=false,%
 pdflang={en},%
 pdftitle={lastpage package example},%
 pdfauthor={H.-Martin Muench},%
 pdfsubject={Example for the lastpage package},%
 pdfkeywords={LaTeX, lastpage},%
 pdfview=Fit,%
 pdfstartview=Fit,%
 pdfpagelayout=SinglePage%
}
%% If hyperref is not used, the url package
%%   https://ctan.org/pkg/url
%% must be loaded for the \url used in this example:
%% \usepackage{url}
%% or just use \let\url\texttt for the one used url.
\usepackage{lastpage}[2023-04-12]% v2.0b
\makeatletter
\renewcommand{\@evenfoot}{%
 \normalsize\slshape \today\hfil \upshape %
 page \thepage{} of \pageref{LastPage}}
\renewcommand{\@oddfoot}{\@evenfoot}
\makeatother
\listfiles
\begin{document}
\pagenumbering{Roman}
\section*{Example for lastpage}
\markboth{Example for lastpage}{Example for lastpage}
This example demonstrates the use of package\newline
\textsf{lastpage}, v2.0b as of 2023-04-12 (HMM; JPG).\newline
The package takes no options.\newline
For more details please see the documentation!\newline

\noindent \label{keys} To hide the \pageref{keys}{\qquad } use option
\texttt{final} instead of \texttt{draft} with the \textsf{showkeys}
package (or remove the package call from the preamble of
this document).\newline

\textbf{Hyperlinks or not:} If the \textsf{hyperref} package is loaded,
```

```
the references are also hyperlinked:\newline
\smallskip
Last page's name (LastPage): \pageref{LastPage}\newline
\noindent If the \textsf{hyperref} package is loaded, but the hyperlinks
of the references shall be suppressed, \verb|\pageref*{...}|
can be used:\newline
\smallskip
Last page's name (LastPage): \pageref*{LastPage}\newline

\textbf{Trademarks} appear throughout this example without any
trademark symbol; they are the property of their respective
trademark owner. There is no intention of infringement; the
usage is to the benefit of the trademark owner.\newline

\textbf{Tip}: Use \textit{logical page numbers}
for the display of the pdf (in Adobe Acrobat Reader 2022.003.20322:
Edit $>$ Preferences $>$ Page Display $>$
Page Content and Information: Use logical page numbers)!\newline

If you are more ambitious in respect to your aims with this package,
you might want to have a look at the \textsf{pageslts} package:\newline
\url{https://ctan.org/pkg/pageslts}.
\bigskip

\noindent The page (\verb|\thepage|): \thepage \newline
Last page's name (LastPage): \pageref{LastPage}
\newpage

\noindent The page (\verb|\thepage|): \thepage \newline
Last page's name (LastPage): \pageref{LastPage}

\bigskip

\noindent There was the question:

\begin{quote}
\begin{verbatim}
\documentclass{article}
\usepackage{hyperref}
\usepackage{lastpage}
\begin{document}
\ifnum\thepage=\pageref{LastPage} foo \else bar \fi
\end{document}
\end{verbatim}

producing the error
\textquotedblleft missing number, treated as zero\textquotedblright.
\end{quote}

\noindent \verb|\pageref| inserts a hyperlink, \verb|\pageref{LastPage}|
is not expandable and the code breaks.\newline
The code does not generally work even without hyperref.

\begin{quote}
\begin{verbatim}
\documentclass{article}
\usepackage{hyperref}
\usepackage{lastpage}
\pagenumbering{Roman}
\begin{document}
\addtocounter{page}{8}
\edef\here{\thepage}
```

```
\makeatletter
\ifx\here\lastpage@lastpage\relax foo \else bar \fi
\makeatother
\end{document}
\end{verbatim}
\end{quote}

\noindent does work, because \verb|\lastpage@lastpage| contains the name
of the page, example:\newline
\verb|Page \thepage{} is page \makeatletter\lastpage@lastpage\makeatother.|%
\newline
prints:\newline
Page \thepage{} is page \makeatletter\lastpage@lastpage\makeatother.%
\newline
This can be broken for example by \verb|\pagenumbering{fnsymbol}|.
\newpage

\noindent The page (\verb|\thepage|): \thepage \newline
Last page's name (LastPage): \pageref{LastPage}
\bigskip

With modern \LaTeX{} it is possible to say:
\begin{quote}
\begin{verbatim}
\NeedsTeXFormat{LaTeX2e}[2022-11-01]
\documentclass{article}
\pagenumbering{fnsymbol}
\begin{document}
\addtocounter{page}{8}%
\makeatletter%
\ExplSyntaxOn%
\xdef\test{\numexpr\the\g_shipout_readonly_int +1\relax}%
\ExplSyntaxOff%
\ifnum \@abspage@last = \test\relax%
This is the last page.%
\else%
This is not the last page
(or it is but \LaTeX{} needs another compilation run
to detect this).
\fi
\makeatother
\end{document}
\end{verbatim}
\end{quote}

\newpage
\section*{The End}
\noindent The page (\verb|\thepage|): \thepage \newline
Last page's name (LastPage): \pageref{LastPage}
\bigskip

To see the content of the \texttt{enddocument/afterlastpage}-hook
(for a recent \LaTeX-format!) use
\verb|\ShowHook{enddocument/afterlastpage}|.% without the \verb||, of course!
\end{document}
```
⟨/example⟩

6 The implementation

lastpage.sty We first need to determine whether we are on TEX 2.09 or LATEX2e.
(That line, which is too long for the documentation, reads:
`\def\loadlastpage{\ProvidesPackage{lastpage}[2023/04/12 v2.0b lastpage: 2.09 or 2e? (HMM)]\relax\RequirePackage{lastpage2e}}`.)

```
⟨*package⟩
%% Part of the "lastpage" package
%% loads either lastpage2.09.sty for TeX 2.09 or lastpage2e.sty for LaTeX 2e
%% with code from https://groups.google.com/g/comp.text.tex/c/-Qmhj1ZI4xM
\def\loadlastpage{\ProvidesPackage{lastpage}[2023/04/12 v2.0b lastpage: 2.09 or 2e? (HMM)]\re
\begingroup \expandafter \ifx \csname documentclass\endcsname\relax
\endgroup \expandafter \input{lastpage209.sty}
\else \endgroup \expandafter \loadlastpage
\fi
⟨/package⟩
```

lastpage209.sty If we are on TEX 2.09 (really?!), we load the 2.09 version lastpage209.sty:

```
⟨*lastpage209⟩
%% Part of the "lastpage" package
%% FOR LaTeX 2.09 ONLY - FOR LaTeX 2e USE lastpage2e.sty
%% This is lastpage209.sty invented by Jeffrey P. Goldberg,
%% after Piet van Oostrum: Page layout in LaTeX, March 2, 2004, section 16; fancyhdr.pdf;
%% lastpage209.sty maintained by H.-Martin Muench.
\let\origenddocument=\enddocument%
\def\enddocument{\clearpage%
  {\addtocounter{page}{-1}%
   \immediate\write\@mainaux{\string\newlabel{LastPage}{{}{\thepage}}}%
  }%
  \addtocounter{page}{+1}%
  \origenddocument%
 }
⟨/lastpage209⟩
```

lastpage2e.sty If `\documentclass` is known, we are in LATEX 2_ε - but which one? For modern versions with ε-TEX and hook management etc. we load version lastpagemodern.sty, otherwise lastpageclassic.sty. We start off by checking that we are loading into LATEX 2_ε and announcing the name and version of this package.

```
⟨*lastpage2e⟩
%% Part of the "lastpage" package
\NeedsTeXFormat{LaTeX2e}[1994/12/01]
\ProvidesPackage{lastpage2e}[2023/04/12 v2.0b Decide which 2e lastpage version to use (HMM)]
\@ifl@t@r\fmtversion{2022/11/01}{\RequirePackage{lastpagemodern}}{%
                                 \RequirePackage{lastpageclassic}}
\message{^^J}
⟨/lastpage2e⟩
```

lastpageclassic.sty In case of older LATEX-formats lastpageclassic.sty is loaded:

```
⟨*lastpageclassic⟩
%% Part of the "lastpage" package
\NeedsTeXFormat{LaTeX2e}[1994/12/01]
\ProvidesPackage{lastpageclassic}[2023/04/12 v2.0b Refers to last page's name (HMM; JPG)]
%% allows for things like "Page \thepage{} of \pageref{LastPage}" to get "Page 7 of 9"

```

For comparisons, "one" is defined (`\@ne` does not work for this).

```
\gdef\lastpage@one{1}
```

We define `\lastpage@hyper`, `\lastpage@nameref`, `\lastpage@french`, and `\lastpage@LTS` to be "0".

```
\gdef\lastpage@hyper{0}
\gdef\lastpage@nameref{0}
```

```
\gdef\lastpage@french{0}
\gdef\lastpage@LTS{0}
```

We define `\lastpage@firstpage` to be "1", and before re-definition via the `.aux` file, `\lastpage@lastpage` and `\lastpage@lastpageHy` are unknown.

```
\gdef\lastpage@firstpage{1}
\gdef\lastpage@lastpage{??}
\gdef\lastpage@lastpageHy{??}

```

`\AtBeginDocument` `\AtBeginDocument` we give a waring about ancient versions of the endfloat package. Then it is checked whether various packages are loaded. (`\@ifpackageloaded` cannot be used later than `\AtBeginDocument`.) If this is the case, `\lastpage@<package abbreviation>` is defined as `1` (otherwise it stays `0`).

```
\AtBeginDocument{%
  \@ifpackageloaded{endfloat}{%
    \@ifpackagelater{endfloat}{1993/04/30}{\relax}{%
      \PackageError{lastpage}{%
        Incompatibility with outdated version of endfloat package}{%
        lastpage is not fully compatible with a version\MessageBreak%
        before 2.1 of the endfloat package,\MessageBreak%
        because those versions redefined\MessageBreak%
        the \string\enddocument\space command.}%
    }}{}%
  \@ifpackageloaded{tikz}{\gdef\lastpage@tikz{1}}{}%
  \@ifpackageloaded{hyperref}{\gdef\lastpage@hyper{1}}{}%
  \@ifpackageloaded{nameref}{\gdef\lastpage@nameref{1}}{}%
  \@ifpackageloaded{french}{\gdef\lastpage@french{1}}{}%
  \@ifpackageloaded{frenchle}{\gdef\lastpage@french{1}}{}%
  \@ifpackageloaded{pagesLTS}{\gdef\lastpage@LTS{1}}{}%
  \@ifpackageloaded{pageslts}{\gdef\lastpage@LTS{1}}{}%
```

`\lastpage@putlabel`, used by older versions of this package, is redefined e. g. by revtex, hyperref, frenchle, and PPRcorners. While now `\lastpage@putl@bel` is used instead, revtex or hyperref could also define a label `LastPage`, which then would be multiply defined. (Which is no big issue, if it is associated with the same page.) Therefore we define

```
  \gdef\lastpage@putlabel{\relax}%
```

Because `\lastpage@putlabel` might be (re)defined later, depending on the order in which the packages are loaded, we will do this again `\AtEndDocument`.

```
  }
```

`\lastpage@putl@bel` This command does the writing of the label:

```
\newcommand{\lastpage@putl@bel}{%
```

`\AtBeginDocument` it is checked whether the hyperref package is loaded, `\@ifpackageloaded{hyperref}{\gdef\lastpage@hyper{1}}{}`.
`\@ifpackageloaded` cannot be used later than `\AtBeginDocument`.
User Sebastian Bank found and reported (Thanks!) a case, when this check is not sufficient. Using a class with
`\usepackage{lastpage}`
`\AtBeginDocument{\usepackage{hyperref}}`
leads to failed detection of the hyperref package, because `\AtBeginDocument` *first* the check for hyperref is performed, and *then* hyperref is loaded. As mentioned above, `\@ifpackageloaded` cannot be used later, so here we do not check for the hyperref package again, but for its `\Hy@Warning` command. In version 1.2c of the lastpage package, it was checked for the `\hyperref` command, but as it turned out, tcilatex *is* defining that. If some other package or user is defining `\Hy@Warning`, lastpage will falsely assume, that hyperref has been loaded, but in

my humble opinion, defining `\Hy@Warning` does not make sense and is bad style (except definition by the hyperref package itself, of course).

```
\@ifundefined{Hy@Warning}{%  hyperref not loaded
  }{\gdef\lastpage@hyper{1}% hyperref loaded
   }%
```

If the pageslts package is used, this lastpage package is not needed at all. The LastPage label would even be defined twice. Thus, if pageslts is used, here nothing is done:

```
\ifx\lastpage@LTS\lastpage@one%
\else%
```

Otherwise the label is set:
We have got to distinguish whether hyperref has been loaded or not:

```
  \ifx\lastpage@hyper\lastpage@one%
    \lastpage@putlabelhyper%
  \else%
```

and also need to treat documents with nameref differently:

```
    \ifx\lastpage@nameref\lastpage@one%
      \lastpage@putlabelNR%
    \else%
```

When those packages have not been loaded, we just write the simple label into the aux file (and store the value of the page):

```
      \begingroup%
        \addtocounter{page}{-1}%
        \immediate\write\@auxout{\string\newlabel{LastPage}{{}{\thepage}}}%
        \immediate\write\@auxout{\string\xdef\string\lastpage@lastpage{\thepage}}%
        \immediate\write\@auxout{\string\gdef\string\lastpage@lastpageHy{}}%
        \addtocounter{page}{+1}%
      \endgroup%
    \fi%
  \fi%
\fi%
}

```

`\lastpage@putlabelhyper` When hyperref has been loaded, the label is set with the `\lastpage@putlabelhyper` command. If the hyperref package is used, but page-anchors are disabled, the hyperlinking will not work.

```
\newcommand{\lastpage@putlabelhyper}{%
  \ifHy@pageanchor%
  \else%
    \PackageError{lastpage}{hyperref option pageanchor disabled}{%
      The \string\pageref{LastPage} link doesn't work\MessageBreak%
      using hyperref with disabled option 'pageanchor'.\MessageBreak%
    }%
  \fi%
```

Since the page has been put out, we are on the page *after* that page. We therefore subtract one from the page counter. (For the compiler, this is equal to `\advance\c@page\m@ne`, but for human readers of the code it is probably easier to understand.)

```
  \begingroup%
    \addtocounter{page}{-1}%
```

Simply using `\label` for `LastPage` would not work, because labels wait for the output routines to work, and there may be no more invocations of the output routines. To force the write out, we need to do an `\immediate` write into the aux file.

```
%% The following code is from the hyperref package          %%
%% 2010/04/17 v6.80x; newer versions are available.         %%
    \let\@number\@firstofone%
    \ifHy@pageanchor%
      \ifHy@hypertexnames%
        \ifHy@plainpages%
          \def\Hy@temp{\arabic{page}}%
        \else%
          \Hy@unicodefalse%
%% Code not from hyperref package:                          %%
%% The following lines are taken from the pageslts package, %%
%% which in turn got them from the hyperref package and     %%
%% modified them.                                           %%
%% Without the modification, after the first shipout "PD1"  %%
%% is inserted each time |\pdfstringdef\Hy@temp{\thepage}|  %%
%% is executed.                                             %%
          \ifnum \value{page}=1\relax%
```

We do not count the pages ourselves, and so they could have been changed by e. g. `\pagenumbering{...}`, `\addtocounter{page}{...}`, `\setcounter{page}{...}`. Thus the page might have the number one while not being the first page at all. Using the everyshi package would help, but this package should not require other packages. The pageslts package does a better handling, but requires some other packages.
We will make a mistake here at most once:

```
            \ifx \lastpage@firstpage\lastpage@one\relax%
              \def\Hy@temp{\thepage}%
              \gdef\lastpage@firstpage{0}%
            \else%
%% Code from hyperref package again:                        %%
                \pdfstringdef\Hy@temp{\thepage}%
%% End of code from the hyperref package.                   %%
          \fi%
%% The pageslts package would even check for fnsymbol page  %%
%% numbering scheme and adapt the code correspondingly.     %%
          \else%
%% Code from hyperref package again:                        %%
            \pdfstringdef\Hy@temp{\thepage}%
%% Code from pageslts package again:                        %%
          \fi%
%% Code from hyperref package again:                        %%
        \fi%
      \else%
        \def\Hy@temp{\the\Hy@pagecounter}%
      \fi%
    \fi%
    \immediate\write\@auxout{%
      \string\newlabel{LastPage}{{}{\thepage}{}{%
          \ifHy@pageanchor page.\Hy@temp\fi}{}}%
    }%
%% End of code from the hyperref package.                   %%
```

We also save the values, so that we can later (next rerun) check, whether they have been saved in the aux file.

```
    \immediate\write\@auxout{\string\xdef\string\lastpage@lastpage{\thepage}}%
    \ifHy@pageanchor%
      \immediate\write\@auxout{\string\xdef\string\lastpage@lastpageHy{\Hy@temp}}%
    \else%
      \immediate\write\@auxout{\string\gdef\string\lastpage@lastpageHy{}}%
    \fi%
```

After the writeout we restore the page number again, since there might be other things still to be done.

```
    \addtocounter{page}{+1}%
  \endgroup%
  }
```

`\lastpage@putlabelNR` The nameref package redefines `\label` to have five arguments instead of two, therefore `\newlabel{LastPage}{{}{\thepage}{}{}{}}` instead of `\newlabel{LastPage}{{}{\thepage}}` must be used:

```
\newcommand{\lastpage@putlabelNR}{%
  \begingroup%
    \addtocounter{page}{-1}%
    \immediate\write\@auxout{\string\newlabel{LastPage}{{}{\thepage}{}{}{}}}%
    \immediate\write\@auxout{\string\xdef\string\lastpage@lastpage{\thepage}}%
    \immediate\write\@auxout{\string\gdef\string\lastpage@lastpageHy{}}%
    \addtocounter{page}{+1}%
  \endgroup%
  }
```

`\lastpage@fileswtest` Later it will be determined whether it is allowed to write to the aux file. If it was *not* allowed, it is checked whether the label was already set via the aux file in some earlier compilation run. (There are packages where the document is compiled with access to the aux file, and then there is an additional compiler run, where the aux file cannot be changed, but in that run there is also no need to change it.) The tikz package is somewhat different, therefore we only give a warning instead of an error (and hope that there is another compiler run where the aux file can be written).

```
\newcommand{\lastpage@fileswtest}[2]{%
  \edef\lastpage@testa{#1}%
  \edef\lastpage@testb{#2}%
  \ifx\lastpage@testa\lastpage@testb%
  \else%
    \ifx\lastpage@tikz\lastpage@one\relax%
      \PackageWarning{lastpage}%
       {The lastpage package was not allowed to write to an\MessageBreak%
        .aux file. This package does not work without access\MessageBreak%
        to an .aux file.\MessageBreak%
        It is OK if the .aux file was already updated\MessageBreak%
        by a previous compiler run\MessageBreak%
        and would not have changed anyway.\MessageBreak%
       }%
    \else%
      \PackageError{lastpage}{No auxiliary file allowed}%
       {The lastpage package was not allowed to write to an .aux file.\MessageBreak%
        This package does not work without access to an .aux file.\MessageBreak%
        Press Ctrl+Z to exit.\MessageBreak%
        But it is OK if the .aux file was already updated\MessageBreak%
        by a previous compiler run\MessageBreak%
        and would not have changed anyway.\MessageBreak%
       }%
    \fi%
  \fi%
  }
```

\lastpage@fileswtestHy When the hyperref package has been loaded, \lastpage@lastpageHy must be tested additionally. (And a \newcommand is needed, because \ifHy@pageanchor is not even defined when hyperref has not been loaded.)

```
\newcommand{\lastpage@fileswtestHy}{%
  \ifHy@pageanchor%
    \lastpage@fileswtest{\Hy@temp}{\lastpage@lastpageHy}%
  \else%
    \lastpage@fileswtest{\empty}{\lastpage@lastpageHy}%
  \fi%
  }

```

\AtEndDocument \AtEndDocument we again (re)define \lastpage@putlabel to do nothing and check \lastpage@lastpage, whether it is still unchanged, which is OK for the first run only.

```
\AtEndDocument{%
  \ifx\lastpage@LTS\lastpage@one%
  \else%
    \gdef\lastpage@putlabel{??}%
    \ifx\lastpage@lastpage\lastpage@putlabel\relax%
      \PackageWarning{lastpage}{Rerun to get the references right}%
    \fi%
  \fi%
  \gdef\lastpage@putlabel{\relax}%
```

It is checked whether writing to files is allowed (otherwise, only an error message is issued and nothing is done).

```
  \if@filesw%
```

We put in a \message to show, in what order things (which were called) are done (see subsection 3.1).

```
    \message{^^JAED: lastpage setting LastPage^^J}%
```

After this we issue a \clearpage to put out all floats, which are still floating, and place the LastPage label. Sometimes \clearpage might be undefined.

```
    \@ifundefined{clearpage}{\relax}{\clearpage}%
    \ifx\lastpage@french\lastpage@one% french or frenchle loaded
      \addtocounter{page}{+1}\lastpage@putl@bel\addtocounter{page}{-1}%
    \else% neither one loaded
      \lastpage@putl@bel%
    \fi%
```

When writing to files is not allowed, nothing can be done. But when the label was already set via the aux file, nothing needs to be done. We check for this with \lastpage@fileswtest and (if hyperref has been loaded) \lastpage@fileswtestHy.

```
  \else%
    \ifx\lastpage@LTS\lastpage@one%
    \else%
      \lastpage@fileswtest{\thepage}{\lastpage@lastpage}%
      \ifx\lastpage@hyper\lastpage@one%
        \lastpage@fileswtestHy%
      \fi%
    \fi%
  \fi%
  }
```

⟨/lastpageclassic⟩

`lastpagemodern.sty` In case of a recent LaTeX-format, lastpagemodern.sty is loaded:

```
⟨*lastpagemodern⟩
%% Part of the "lastpage" package
\NeedsTeXFormat{LaTeX2e}[2022-11-01]
\ProvidesPackage{lastpagemodern}[2023-04-12 v2.0b Refers to last page's name (HMM; JPG)]
%% allows for things like "Page \thepage{} of \pageref{LastPage}"
%% to get "Page 7 of 9" or "Page VII of IX";
%% the NUMBER of pages is available via \@abspage@last, but with pages
%% for example I to X and then 1 to 10, the number of pages woud be "20",
%% while the name of the last page is "10". Decide what you need/want!

```

For comparisons, "one" is defined (`\@ne` does not work for this).

```
\gdef\lastpage@one{1}
```

We define `\lastpage@firstpage` to be "1", and before re-definition via the `.aux` file, `\lastpage@lastpage` and `\lastpage@lastpageHy` are unknown.

```
\gdef\lastpage@firstpage{1}
\gdef\lastpage@lastpage{??}
\gdef\lastpage@lastpageHy{??}

```

`\AddToHook{begindocument/end}` At `begindocument/end` we give a warning about ancient versions of the endfloat package.

```
\AddToHook{begindocument/end}{%
  \IfPackageLoadedTF{endfloat}{%
    \IfPackageAtLeastTF{endfloat}{1994/06/01}{\relax}{%
      \PackageError{lastpage}{%
        Incompatibility with outdated version of endfloat package}{%
        lastpage is not fully compatible with a version\MessageBreak%
        before 2.1 of the endfloat package,\MessageBreak%
        because those versions redefined\MessageBreak%
        the \string\enddocument\space command.}%
    }}{}%
```

`\lastpage@putlabel`, used by older versions of this package, is redefined e. g. by revtex, hyperref, frenchle, and PPRcorners. While now `\lastpage@putl@bel` is used instead, revtex or hyperref could also define a label `LastPage`, which then would be multiply defined. (Which is no big issue, if it is associated with the same page.) Therefore we define

```
  \gdef\lastpage@putlabel{\relax}%
```

Because `\lastpage@putlabel` might be (re)defined later, depending on the order in which the packages are loaded, we will do this again at the end of the document.

```
  }

```

`\lastpage@putl@bel` This command does the writing of the label. If the pageslts package is used, this lastpage package is not needed at all. The LastPage label would even be defined twice. Thus, if pageslts is used, here nothing is done.

```
\newcommand{\lastpage@putl@bel}{%
  \IfPackageLoadedTF{pageslts}{\relax}{%
```

Otherwise the label is set:
We have got to distinguish whether hyperref has been loaded or not:

```
    \IfPackageLoadedTF{hyperref}{\lastpage@putlabelhyper}{%
```

and also need to treat documents with nameref differently:

```
      \IfPackageLoadedTF{nameref}{\lastpage@putlabelNR}{%
```

When those packages have not been loaded, we just write the simple label into the aux file (and store the value of the page):

```
        \begingroup%
          \addtocounter{page}{-1}%
          \immediate\write\@auxout{\string\newlabel{LastPage}{{}{\thepage}}}%
          \immediate\write\@auxout{\string\xdef\string\lastpage@lastpage{\thepage}}%
          \immediate\write\@auxout{\string\gdef\string\lastpage@lastpageHy{}}%
          \addtocounter{page}{+1}%
        \endgroup%
      }%
    }%
  }%
}
```

`\lastpage@putlabelhyper` When hyperref has been loaded, the label is set with the `\lastpage@putlabelhyper` command. If the hyperref package is used, but page-anchors are disabled, the hyperlinking will not work.

```
\newcommand{\lastpage@putlabelhyper}{%
  \ifHy@pageanchor%
  \else%
    \PackageError{lastpage}{hyperref option pageanchor disabled}{%
      The \string\pageref{LastPage} link does not work\MessageBreak%
      using hyperref with disabled option 'pageanchor'.\MessageBreak%
    }%
  \fi%
```

Since the page has been put out, we are on the page *after* that page. We therefore subtract one from the page counter. (For the compiler, this is equal to `\advance\c@page\m@ne`, but for human readers of the code it is probably easier to understand.)

```
  \begingroup%
    \addtocounter{page}{-1}%
```

Simply using `\label` for `LastPage` would not work, because labels wait for the output routines to work, and there may be no more invocations of the output routines. To force the write out, we need to do an `\immediate` write into the aux file.

```
%% The following code is from the hyperref package          %%
%% 2010/04/17 v6.80x; newer versions are available.         %%
    \let\@number\@firstofone%
    \ifHy@pageanchor%
      \ifHy@hypertexnames%
        \ifHy@plainpages%
          \def\Hy@temp{\arabic{page}}%
        \else%
          \Hy@unicodefalse%
%% Code not from hyperref package:                          %%
%% The following lines are taken from the pageslts package, %%
%% which in turn got them from the hyperref package and     %%
%% modified them.                                           %%
%% Without the modification, after the first shipout "PD1"  %%
%% is inserted each time |\pdfstringdef\Hy@temp{\thepage}|  %%
%% is executed.                                             %%
          \ifnum \value{page}=1\relax%
```

We do not count the pages ourselves, and so they could have been changed by e. g. `\pagenumbering{...}`, `\addtocounter{page}{...}`, `\setcounter{page}{...}`. Thus the page might have the number one while not being the first page at all. Using the (obsolete) everyshi package would help, but this package should not require other packages. The pageslts package does a better

handling, but requires some other packages.
We will make a mistake here at most once:

```
            \ifx \lastpage@firstpage\lastpage@one\relax%
              \def\Hy@temp{\thepage}%
              \gdef\lastpage@firstpage{0}%
            \else%
%% Code from hyperref package again:                          %%
                \pdfstringdef\Hy@temp{\thepage}%
%% End of code from the hyperref package.                     %%
          \fi%
%% The pageslts package would even check for fnsymbol page    %%
%% numbering scheme and adapt the code correspondingly.       %%
          \else%
%% Code from hyperref package again:                          %%
            \pdfstringdef\Hy@temp{\thepage}%
%% Code from pageslts package again:                          %%
          \fi%
%% Code from hyperref package again:                          %%
        \fi%
      \else%
        \def\Hy@temp{\the\Hy@pagecounter}%
      \fi%
    \fi%
    \immediate\write\@auxout{%
      \string\newlabel{LastPage}{{}{\thepage}{}{%
          \ifHy@pageanchor page.\Hy@temp\fi}{}}%
    }%
%% End of code from the hyperref package.                     %%
```

We also save the values, so that we can later (next rerun) check, whether they have been saved in the aux file.

```
    \immediate\write\@auxout{\string\xdef\string\lastpage@lastpage{\thepage}}%
    \ifHy@pageanchor%
      \immediate\write\@auxout{\string\xdef\string\lastpage@lastpageHy{\Hy@temp}}%
    \else%
      \immediate\write\@auxout{\string\gdef\string\lastpage@lastpageHy{}}%
    \fi%
```

After the writeout we restore the page number again, since there might be other things still to be done.

```
    \addtocounter{page}{+1}%
  \endgroup%
  }

```

`\lastpage@putlabelNR` The nameref package redefines `\label` to have five arguments instead of two, therefore
`\newlabel{LastPage}{{}{\thepage}{}{}{}}` instead of
`\newlabel{LastPage}{{}{\thepage}}` must be used:

```
\newcommand{\lastpage@putlabelNR}{%
  \begingroup%
    \addtocounter{page}{-1}%
    \immediate\write\@auxout{\string\newlabel{LastPage}{{}{\thepage}{}{}{}}}%
    \immediate\write\@auxout{\string\xdef\string\lastpage@lastpage{\thepage}}%
    \immediate\write\@auxout{\string\gdef\string\lastpage@lastpageHy{}}%
    \addtocounter{page}{+1}%
  \endgroup%
  }

```

\lastpage@fileswtest Later it will be determined whether it is allowed to write to the aux file. If it was *not* allowed, it is checked whether the label was already set via the aux file in some earlier compilation run. (There are packages where the document is compiled with access to the aux file, and then there is an additional compiler run, where the aux file cannot be changed, but in that run there is also no need to change it.) The tikz package is somewhat different, therefore we only give a warning instead of an error (and hope that there is another compiler run where the aux file can be written).

```
\newcommand{\lastpage@fileswtest}[2]{%
  \edef\lastpage@testa{#1}%
  \edef\lastpage@testb{#2}%
  \ifx\lastpage@testa\lastpage@testb%
  \else%
    \IfPackageLoadedTF{tikz}{%
      \PackageWarning{lastpage}%
       {The lastpage package was not allowed to write to an\MessageBreak%
        .aux file. This package does not work without access\MessageBreak%
        to an .aux file.\MessageBreak%
        It is OK if the .aux file was already updated\MessageBreak%
        by a previous compiler run\MessageBreak%
        and would not have changed anyway.\MessageBreak%
       }%
    }{\PackageError{lastpage}{No auxiliary file allowed}%
       {The lastpage package was not allowed to write to an .aux file.\MessageBreak%
        This package does not work without access to an .aux file.\MessageBreak%
        Press Ctrl+Z to exit.\MessageBreak%
        But it is OK if the .aux file was already updated\MessageBreak%
        by a previous compiler run\MessageBreak%
        and would not have changed anyway.\MessageBreak%
       }%
     }%
  \fi%
  }

```

\lastpage@fileswtestHy When the hyperref package has been loaded, \lastpage@lastpageHy must be tested additionally. (And a \newcommand is needed, because \ifHy@pageanchor is not even defined when hyperref has not been loaded.)

```
\newcommand{\lastpage@fileswtestHy}{%
  \ifHy@pageanchor%
    \lastpage@fileswtest{\Hy@temp}{\lastpage@lastpageHy}%
  \else%
    \lastpage@fileswtest{\empty}{\lastpage@lastpageHy}%
  \fi%
  }

```

enddocument/afterlastpage enddocument/afterlastpage we again (re)define \lastpage@putlabel to do nothing, but first use it to check whether \lastpage@lastpage is still unchanged, which is OK for the first run only.

```
\AddToHook{enddocument/afterlastpage}{%
  \IfPackageLoadedTF{pageslts}{\relax}{%
    \gdef\lastpage@putlabel{??}%
    \ifx\lastpage@lastpage\lastpage@putlabel\relax%
      \AddToHook{enddocument/info}{%
        \PackageWarning{lastpage}{Rerun to get the references right}%
       }%
    \fi%
    }%
  \gdef\lastpage@putlabel{\relax}%
```

It is checked whether writing to files is allowed (otherwise, only an error message is issued and nothing is done).

```
\if@filesw%
```

We put in a `\message` to show, in what order things (which were called) are done.

```
    \message{^^Jenddocument/afterlastpage: lastpage setting LastPage.^^J}%
    \IfPackageLoadedTF{french}{%
         \addtocounter{page}{+1}\lastpage@putl@bel\addtocounter{page}{-1}%
     }{\IfPackageLoadedTF{frenchle}{%
         \addtocounter{page}{+1}\lastpage@putl@bel\addtocounter{page}{-1}%
       }{\lastpage@putl@bel%
        }%
      }%
  \else%
```

When writing to files is not allowed, nothing can be done. But when the label was already set via the `aux` file, nothing needs to be done. We check for this with `\lastpage@fileswtest` and (if hyperref has been loaded) `\lastpage@fileswtestHy`.

```
    \IfPackageLoadedTF{pageslts}{\relax}{%
      \lastpage@fileswtest{\thepage}{\lastpage@lastpage}%
      \IfPackageLoadedTF{hyperref}{\lastpage@fileswtestHy}{\relax}%
     }%
  \fi%
  }
```

⟨/lastpagemodern⟩

7 Installation

7.1 Downloads

Everything is available at https://www.ctan.org, but may need additional packages themselves.

`lastpage.dtx` For unpacking the `lastpage.dtx` file and constructing the documentation it is required:

- TEXFormat LaTeX 2ε: https://www.CTAN.org
- document class ltxdoc, 2022/06/22, v2.1i, https://ctan.org/pkg/ltxdoc
- package holtxdoc, 2019/12/09, v0.30, https://ctan.org/pkg/holtxdoc

`lastpage.sty` The `lastpage.sty` (i. e. each document using the lastpage package) requires:

- TEX, https://www.CTAN.org
- package lastpage, 2023-04-12, v2.0b, https://ctan.org/pkg/lastpage

`lastpage209.sty` The `lastpage209.sty` for LaTeX2.09 (i. e. each document using the lastpage209 package) requires:

- TEX-format LaTeX, v2.09
- package lastpage209, 2023-04-12, v2.0b, https://ctan.org/pkg/lastpage

and does not work with hyperref, which needs LaTeX2e.

`lastpage2e.sty` The `lastpage2e.sty` for LaTeX 2ε (i. e. each document using the lastpage2e package) requires:

- TEX-format LaTeX 2ε 1994/12/01 or newer, https://www.CTAN.org
- package lastpage, 2023-04-12, v2.0b, https://ctan.org/pkg/lastpage

`lastpageclassic.sty` The `lastpageclassic.sty` for LaTeX 2ε (i. e. each document using the lastpageclassic package) requires:

- TEX-format LaTeX 2ε between 1994/12/01 and 2022/11/01, https://www.CTAN.org
- package lastpage, 2023-04-12, v2.0b, https://ctan.org/pkg/lastpage

and can use

- package hyperref, 2023-02-07, v7.00v, https://ctan.org/pkg/hyperref

`lastpagemodern.sty` The `lastpagemodern.sty` for LaTeX 2ε (i. e. each document using the lastpagemodern package) requires:

- TEX-format LaTeX 2ε 2022-11-01 or newer, https://www.CTAN.org
- package lastpage, 2023-04-12, v2.0b, https://ctan.org/pkg/lastpage

and can use

- package hyperref, 2023-02-07, v7.00v, https://ctan.org/pkg/hyperref

`lastpage-example.tex` The `lastpage-example.tex` requires the same file as all documents using the lastpage package, i. e.

- package lastpage, 2023-04-12, v2.0b, https://ctan.org/pkg/lastpage
  (Well, it is the example file for this package, and because you are reading the documentation for the lastpage package, it can be assumed that you already have some version of it – is it the current one?)

and additionally:

- class article, 2022/07/02, v1.4n, from classes: https://ctan.org/pkg/classes
- package showkeys, 2022/04/12, v3.18, https://ctan.org/pkg/showkeys
- package hyperref, 2023-02-07, v7.00v, https://ctan.org/pkg/hyperref

endfloat

The endfloat package is not required, but because the lastpage package is incompatible with *ancient* versions of the endfloat package (see subsection 3.2), here the recent one (at the time of writing this documentation) is listed:

- package endfloat, 2019/04/15, v2.7, https://ctan.org/pkg/endfloat

fancyhdr
nccfancyhdr

Neither the fancyhdr nor the nccfancyhdr package is required (older versions of the lastpage package used its predecessor fancyheadings), but because they were mentioned, also they are listed here:

- package fancyhdr, 2022/11/09, v4.1, https://ctan.org/pkg/fancyhdr
- package nccfancyhdr, 2004/12/07, v1.1, https://ctan.org/pkg/nccfancyhdr

count1to
nofm
totpages
lastpage
totalcount
zref
memoir

As possible alternatives in section 4, Alternatives, there are listed (newer versions might be available):

- package pageslts, 2015/12/21, v1.2f, https://ctan.org/pkg/pageslts
- package papermas, 2011/08/22, v1.0h; the papermas package can be considered as kind of add-on to the pageslts package. https://ctan.org/pkg/papermas
- package count1to, 2009/05/24, v2.1, https://ctan.org/pkg/count1to
- package nofm, 1991/02/25, https://mirror.ctan.org/obsolete/macros/latex209/contrib/misc/nofm.sty, does not work with e. g. hyperref
- package totpages, 2005/09/19, v2.00, https://ctan.org/pkg/totpages
- package totalcount, 2018/01/21, v1.0a, https://ctan.org/pkg/totalcount
- package zref, 2022-04-07, v2.34, https://ctan.org/pkg/zref
- class memoir, 2022-11-17, 3.7.19, https://ctan.org/pkg/memoir.

Oberdiek
holtxdoc
zref

All packages of the 'oberdiek' bundle (especially holtxdoc and zref) are also available in a TDS compliant ZIP archive: https://mirror.ctan.org/install/macros/latex/contrib/oberdiek.tds.zip. It is probably best to download and use this, because the packages in there are quite probably both recent and compatible among themselves.

hyperref

hyperref is not included in that bundle and needs to be downloaded separately, https://mirror.ctan.org/install/macros/latex/contrib/hyperref.tds.zip.

Münch

A hyperlinked list of my (other) packages can be found at https://ctan.org/author/muench-hm.

7.2 Package, unpacking TDS

Package. This package is available on https://www.CTAN.org.

https://mirror.ctan.org/macros/latex/contrib/lastpage/lastpage.dtx
The source file.

https://mirror.ctan.org/macros/latex/contrib/lastpage/lastpage.pdf
The documentation.

https://mirror.ctan.org/macros/latex/contrib/lastpage/lastpage-example.pdf
The compiled example file, as it should look like.

https://mirror.ctan.org/macros/latex/contrib/lastpage/README
The README file.

There is also a `lastpage.tds.zip` available:

https://mirror.ctan.org/install/macros/latex/contrib/lastpage.tds.zip
Everything in TDS compliant, compiled format

which additionally contains

lastpage.ins	The installation file.
lastpage.drv	The driver to generate the documentation.
lastpage.sty	The `.style` file.
lastpage209.sty	The `.style` file for LaTeX2.09 **only**.
lastpage2e.sty	The `.style` file to determine which 2e-style to use.
lastpageclassic.sty	The `.style` file for older LaTeX-formats.
lastpagemodern.sty	The `.style` file for the recent LaTeX-format.
lastpage-example.tex	The example file.

For required other packages please see the preceding subsection.

Unpacking. The `.dtx` file is a self-extracting docstrip archive. The files are extracted by running the `..dtx` through plain TeX:

```
tex lastpage.dtx
```

About generating the documentation see paragraph 7.4 below.

TDS. Now the different files must be moved into the different directories in your installation TDS tree (also known as `texmf` tree):

```
lastpage.sty          → tex/latex/lastpage.sty
lastpage209.sty       → tex/latex/lastpage.sty
lastpage2e.sty        → tex/latex/lastpage.sty
lastpageclassic.sty   → tex/latex/lastpage.sty
lastpagemodern.sty    → tex/latex/lastpage.sty
lastpage.pdf          → doc/latex/lastpage.pdf
lastpage-example.tex  → doc/latex/lastpage-example.tex
lastpage-example.pdf  → doc/latex/lastpage-example.pdf
lastpage.dtx          → source/latex/lastpage.dtx
```

If you have a `docstrip.cfg` that configures and enables docstrip's TDS installing feature, then some files can already be in the right place, see the documentation of docstrip.

7.3 Refresh file name databases

If your TeX distribution (TeX Live, MiKTeX, ...) relies on file name databases, you must refresh these. For example, TeX Live users run `texhash` or `mktexlsr`.

7.4 Some details for the interested

Unpacking with LaTeX. The `.dtx` chooses its action depending on the format:

plain TeX: Run docstrip and extract the files.

LaTeX: Generate the documentation.

If you insist on using LaTeX for docstrip (really, docstrip does not need LaTeX), then inform the autodetect routine about your intention:

```
latex \let\install=y\input{lastpage.dtx}
```

Do not forget to quote the argument according to the demands of your shell.

Generating the documentation. You can use both the `.dtx` or the `.drv` to generate the documentation. The process can be configured by a configuration file `ltxdoc.cfg`. For instance, put the following line into this file, if you want to have A4 as paper format:

```
\PassOptionsToClass{a4paper}{article}
```

An example follows how to generate the documentation with pdfLaTeX:

```
pdflatex lastpage.dtx
makeindex -s gind.ist lastpage.idx
pdflatex lastpage.dtx
makeindex -s gind.ist lastpage.idx
pdflatex lastpage.dtx
```

7.5 Compiling the example

The example file, lastpage-example.tex, can be compiled via
`latex lastpage-example.tex`
or (recommended)
`pdflatex lastpage-example.tex`
and will need at least two compiler runs to get all references right.

8 Acknowledgements

I (H.-Martin Münch) would like to thank Jeffrey P. Goldberg (jeffrey+news at goldmark dot org) for inventing the lastpage package as well as for allowing me to update it. Further I would like to thank Heiko Oberdiek for providing a lot (!) of useful packages (from which I also learned everything I know about creating a file in `dtx` format, OK, say it: copying), and the news:comp.text.tex and news:de.comp.text.tex newsgroups for their help in all things TeX. Thanks for bug reports to Ulrike Fischer, Sebastian Bank, James Hedges, Mikhail Titov, Michał Herman, and Matteo Gamboz. Thanks to Sven Siegmund for pointing out a necessary further explanation in the documentation.

9 History

[1994/06/17 v0.99a]

- First shot by Jeffrey P. Goldberg.

[1994/06/25 v0.1b]

- Last version number created by Jeffrey P. Goldberg.

[1994/07/20 v0.1b (again)]

- Documentation updated by Jeffrey P. Goldberg.
  The main source code of the lastpage package 1994/07/20, v0.1b, was:

```
\NeedsTeXFormat{LaTeX2e}[1994/06/01]
\ProvidesPackage{lastpage}[1994/07/20 v0.1b
  LaTeX2e package for refs to last page number (JPG)]
\def\lastpage@putlabel{\addtocounter{page}{-1}%
  \immediate\write\@auxout{\string
  \newlabel{LastPage}{{}{\thepage}}}%
  \addtocounter{page}{1}}
\AtEndDocument{%
  \message{AED: lastpage setting LastPage}%
  \clearpage\lastpage@putlabel}%
\endinput
```

  and then the hyperref package and the revtex4 class even redefine `\lastpage@putlabel` (at least hyperref version 2012/11/06, v6.83m, and REVTEX4 version 2010/07/25, v4.1r, still did this).

[2010/02/18 v1.1]

- Proposed `LastPages` label by H.-Martin Münch on news:comp.text.tex, see e. g. https://groups.google.com/g/comp.text.tex/c/Ad8pO2Rw_HY/m/8EfHqT1JB0QJ; now available in the pageslts package.

[2010/07/29 v1.2a]

- Complete rewriting of the package; upgrade from fancyheadings to fancyhdr package, then removed the need for the fancyhdr package at all.
- Included lastpage209.sty for LaTeX2.09.
- Replacement of `\filedate`, `-version`, `-name`,... because of LaTeX bug 2705:
  Synopsis: Possible problem with `\fileversion` and `\filedate`
  https://www.latex-project.org/cgi-bin/ltxbugs2html?category=LaTeX&responsible=anyone&state=anything&keyword=lastpage&pr=latex/2705
- Example `lastpage-example.tex`.
- Alternatives listing (section 4).
- Listing of TeX sources (subsection 7.1).
- Really a lot of details.
- Complete rewriting of the documentation.

- Everything in DTX framework.
- Included a \CheckSum. [Removed in v2.0a.]
- Complete rewriting of the README file.

[2010/08/12 v1.2b]

- Bug fix: \@PackageInfoNoLine is only available, if the hyperref package is loaded. (Bug reported by Ulrike Fischer, thanks!)
- Bug fix: \ifHy@pageanchor etc. do not work without hyperref, and \else related to \ifHy@pageanchor was wrongly associated with a preceding \if, and everything went wrong. Now everything should work again also without hyperref.
- Renamed \lastpage@putlabel to \lastpage@putl@bel to get rid of the conflicts with other classes and packages and resulting multiple definitions of the lastpage label.

[2010/08/23 v1.2c]

- Bug fix: Additionally to checking for the hyperref package \AtBeginDocument, when placing the lastpage label it is also checked for the \hyperref command, in case hyperref was not loaded at \begin{document} yet. (Bug reported by Sebastian Bank, thanks!) [lastpagemodern.sty just uses \IfPackageLoadedTF{hyperref}.]
- Changed the \unit definition (got rid of an old \rm). [Removed in v2.0a.]
- Changed \lastpage@puthyperlabel to \lastpage@putlabelhyper analogous to \pagesLTS@putlabelhyper of the pageslts package.
- Updated version number and date of pagesLTS package (especially for the check for outdated versions). [Removed in v2.0a.]
- Removed wrong % from the driver file.

[2010/08/25 v1.2d]

- Bug fix: also tcilatex defines the \hyperref command, therefore for hyperref package detection this had to be changed to \Hy@Warning. [lastpagemodern just uses \IfPackageLoadedTF{hyperref}.]

[2010/09/12 v1.2e]

- James Hedges pointed out, that there was no instruction in the documentation about suppressing hyperlinks: added (also to the example).
- Diverse small changes.

[2010/09/24 v1.2f]

- Updated to version 2010/09/13 v6.81n of the hyperref package.
- New version of REVTEX4 2010/07/25, v4.1r, old problem.
- New version of pagesLTS package, 2010/09/22, v1.1k.
- Moved the package from .../latex/muench/lastpage/... to .../latex/lastpage/....

[2011/02/01 v1.2g]

- Updated to version 2010/04/24 v0.19 of the holtxdoc package.
- New version of pagesLTS package, 2011/02/01, v1.1m.
- Updated to version 2010/12/16 v6.81z of the hyperref package.
- Minor details.

[2011/07/03 v1.2h]

- The holtxdoc package was fixed, therefore the warning in `drv` could be removed. – Adapted the style of this documentation to new Oberdiek `dtx` style.
- New versions of pagesLTS, ulem, hyperref, papermas packages.
- Corrected references in the README and manual.

[2011/08/08 v1.2i]

- The pagesLTS package has been renamed to pageslts: 2011/08/08, v1.2a.
- Some details.

[2011/08/31 v1.2j]

- Updated to TeX Live 2011 (for compiling the documentation and example).
- New version of papermas package, 2011/08/22, v1.0h.
- Adapted for the use together with packages, which sometimes prevent writing to the aux file. (Bug reported by Mikhail Titov.)

[2011/09/01 v1.2k]

- Fixed `\thepage{}` to `\thepage{}` , where there should be a space.
- New version of the hyperref package, 2011/08/19, v6.82h, but still problem with links to pages with page-"number" in `fnsymbol` pagenumbering scheme. [Seems to be fixed since v6.83m as of 2012/11/06.]
- Documentation update about "No write access to the aux file".
- New version of regstats package available.

[2013/01/28 v1.2l]

- Updated to TeX Live 2012 (for compiling the documentation and example).
- New versions of the packages endfloat, holtxdoc, hypdoc, hyperref, pageslts, regstats, ulem, and zref have become available.
- The nameref package redefines `\label` to have five arguments instead of two, therefore `\newlabel{LastPage}{{}{\thepage}{}{}{}}` instead of `\newlabel{LastPage}{{}{\thepage}}` must be used. (Bug reported at https://tex.stackexchange.com/q/95541, thanks to Michał Herman!) Fixed.

[2015/03/29 v1.2m]

- Updated to TeX Live 2014 (for compiling the documentation and example).
- Updates to really a lot of details in the documentation (manual & README).

[2021/09/03 v1.2n]

- Updates to the documentation (manual & README), to the example, and several small changes in code.
- This version has been archived at https://web.archive.org/web/20230305193232/https://mirror.ctan.org/install/macros/latex/contrib/lastpage.tds.zip.

[2023-03-07 v2.0a]

- Removed use of ulem.
- Removed `\unit`.
- lastpage should now determine automatically, whether to load its TeX 2.09 version, classic LaTeX2e-version, or modern version with ε-TeX, hook-management etc.
- Converted to UTF-8.
- Updated to LaTeX format 2022-11-01.
- Extensive updates to the documentation (manual & README) and to the example.

[2023-04-12 v2.0b]

- Bug fix: What should have been `}}{}` was `}{}}`. Thanks to Matteo Gamboz!

When you find a mistake or have a suggestion for an improvement of this package, please send an e-mail to the maintainer, thanks! (Please see BUG REPORTS in the README.)

10 Index

Numbers written in italic refer to the page where the corresponding entry is described; numbers underlined refer to the code line of the definition; plain numbers refer to the code lines where the entry is used.